(10) Japanese Patent Office (JP)

(11) Unexamined Utility Model Publication No.

S61-111405

(12) Publication of Unexamined Utility model

(43) Laid open on July 15, 1986

(51) Int. Cl: A 61 B 5/02

Identification No: 103

JPO File No: 7046-4C

Request for Examination not yet filed (total pages)

(54) TITLE OF THE INVENTION

ELECTRONIC MANOMETER

(21) U.M. Application No: S59-198630

(22) Application Date: December 25, 1984

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SPECIFICATION

1. TITLE OF THE INVENTION

ELECTRONIC MANOMETER

2. SCOPE OF CLAIM FOR UTILITY MODEL REGISTRATION

1) An electronic manometer comprising a blood vessel percutaneous pressing device having a pressing unit for changing a blood stream by percutaneously pressing a blood vessel and a pressing force generating unit for operating the pressing unit, and a blood stream detecting device for detecting the change of the blood stream generated when the blood vessel is pressed by the blood vessel percutaneous pressing device and oscillating a blood stream waveform, wherein

a set blood pressure generating unit capable of previously setting a plurality of pressing forces for percutaneously pressing the blood vessel and thereby changing the pressing force in stages in a short period of time is provided in the blood vessel percutaneous pressing device, and

a blood pressure calculating device for momentarily showing an approximate expression of a relation between a blood pressure and a waveform peak value of the blood stream waveform oscillated from the blood stream detecting device corresponding to each pressing value changed in stages obtained by variously pressing the blood vessel in the stages through skin in response

to the pressing force generated by the set blood pressure generating unit and received by the pressing unit based on the pressing value and the waveform peak value and calculating a highest blood pressure and a lowest blood pressure by means of extrapolation.

(EMBODIMENTS)

Hereinafter, preferred embodiments of the present utility model are described referring to the drawings.

Fig. 1 is a block diagram illustrating an embodiment of the present utility model.

Referring to the numerals shown in the drawing, 1 denotes a blood stream sensor comprising a light-emitting element and a light-receiving element (for example, combination of LED and photo transistor) and oscillating a blood stream signal by irradiating a light on a blood vessel in a fingertip, detecting changes of a blood stream by a reflectivity of the light and photoelectrically converting the detecting result, 2 denotes a cuff made of a flexible member and formed in a cylindrical shape so that a finger can be inserted thereinto and pressing a base part of the inserted finger by pressurized water as a pressurized medium introduced into the cylindrical cuff, 3 denotes a set blood pressure generating unit for previously setting a pressing force for percutaneously pressing the blood vessel to three stages in total, which are non-pressure and two pressure values so that the pressing force can be changed in the three stages in ten seconds, 4 denotes a blood pressure calculating unit for calculating the blood pressure by means of extrapolation based on each pressing value obtained by variously pressing the blood vessel in the stages in response to the water pressure generated by the set pressure generating

unit 3 and received by the cuff 2 and a waveform peak value of a blood stream waveform oscillated from the blood stream sensor 1 corresponding to each pressing value, 5 denotes a memorizing unit for memorizing the measured data and the like, 6 denotes a display unit for displaying the measured data and the like, and 7 denotes a microcomputer for controlling the blood pressure calculating unit 4, memorizing unit 5 and display unit 6.

An approximation of the relation between the blood pressure and the waveform peak value is obtained based on the set pressing force of the base part of the finger inserted into the cuff and the waveform peak value of the blood stream signal detected by the blood stream sensor 1 so that a highest blood pressure and a lowest blood pressure are obtained by means of the extrapolation.

Fig. 2 shows a relationship between the pressing force and the waveform peak value of the blood stream waveform.

Reference symbols P_0, P_1 and P_2 denote pressures of the water introduced into the cuff 2 by the set pressure generating unit 4 and also pressing forces. Reference symbol P_0 denotes that a pressure value is zero. Reference symbols e_1 and e_2 are the waveform peak values of the blood stream waveform in response to P_1 and P_2 generated by the set pressure generating unit when the blood vessel is pressed, Reference symbol $e\ell$ denotes the waveform peak value in response to P_0, that is the nil pressure value, Reference symbol $P\ell$ denotes the lowest blood pressure

value, and Ph denotes the highest blood pressure value.

P_1 and P_2 are known values, and reference numerals 8 and 9 denote points where the waveform peak value e_1 is plotted in response to the pressing force P_1, and the waveform peak value e_2 is plotted in response to the pressing force P_2 in coordinates. An approximate curved line 10 is drawn so that the line passes through the plotted points 8 and 9. Then, an approximate expression is obtained.

The lowest blood pressure value can be calculated and obtained in such a manner that the waveform peak value $e\ell$ is assigned to the approximate expression when the pressing force is zero as P_0l. The highest blood pressure value can be obtained in such a manner that the waveform peak value zero is assigned to the approximate expression because the waveform peak value is zero. The already known pressing forces are set to be different in the three states in total, which are the non-pressure and two pressure values. The pressing forces should range in at least the three different stages of the non-pressure and two pressure values, and the range may be appropriately selected.